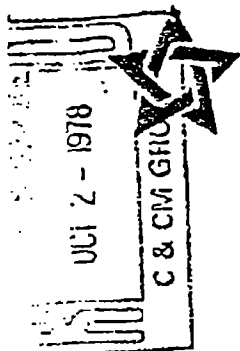


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Interoffice Memo



LONE STAR INDUSTRIES, INC.

P. O. Box 2148, Houston, Texas 77001

September 29, 1978

TO: M. M. Reid
FROM: R. Lajaunie/L. Jung
SUBJECT: Seattle Plant Visit - Spiral Chain Installation

cc: J. Young
W. McClinton
L. Beckham
L. Fuller
C. D. Fehnel
C. W. Moore

This report will summarize the observations made during the Seattle plant visit of R. Lajaunie and L. Jung September 11-15, 1978 relative to the possibility of installing a spiral chain system in the Seattle kilns.

Quarry:

The Texada Quarry, at this time, has a limestone reserve of 8,576,000 tons. Present production figures indicate that 2400 lbs. of limestone is required per ton of clinker. Present clinker production is approximately 175,000 tons per year. This results in a yearly use of approximately 210,000 tons of limestone per year. At this rate, the Texada limestone presently available would have a life of about 40 years.

It is estimated that the clinker production will be increased to approximately 282,000 tons per year, resulting in a usage of 342,000 tons of limestone per year. This would shorten the expected life of the Texada limestone now available to 25 years.

Crusher:

The rated capacity of the crusher is 110 tons per hour. Actual production rate is 60 tons per hour and reaches a low production of 40 tons per hour when wet material is encountered. For calculation purposes, it will be necessary to use the minimum rate of production in order to emphasize the critical point which may be reached.

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At a production rate of 282,000 tons of clinker per year and using an 85 percent availability factor for the crusher it will be necessary to maintain a production rate of at least 45 tons per hour at the crusher.

The increased rock usage will also result in added delays and overlapping of unloaded between clinker ships and rock barges.

Raw Mill:

With a clinker production rate of 282,000 tons per year, the raw mill will be required to maintain a production rate of at least 41 tons per hour of slurry based on an availability of 85 percent. The raw mill is capable of producing approximately 70 tons per hour utilizing all mills when grinding Type II slurry. When grinding Type III slurry, the raw mills can produce at a rate of 35 tons per hour. This will be a critical area if the kiln production is increased.

At present, at least one mill operation is required on a continual basis in order to return the kiln dust collected. This could result in a problem if additional dust is generated with increased kiln production. A minimum amount of dust can now be retained before returning it to the raw mill system.

Slurry Basins:

The existing slurry basins have a total capacity of 2760 tons of slurry. At the present rate of clinker production, the kiln feed basin will support two kiln operation for approximately 24 hours. At the increased kiln production, it will support kiln operation for 16 hours. At this rate, the raw mix will not allow for unusual fluctuations in the control.

The entire slurry basin system will support two kiln operation for approximately four days. At the increased kiln production, it will support two kiln operation for approximately two and one-half days.

All slurry basins are equipped with Dorr agitators. This agitation allows for sufficient blending at the proposed rate increases and existing moisture holding point. A problem could be encountered if the moisture holding point was lowered without the addition of slurry thinners.

Slurry Pumps:

The existing slurry pumps are adequate for present production at the present moisture holding point. Reduced moisture and increased production rate could create problems particularly in the supplying of slurry to the kilns. This area will have to be investigated.

Kilns:

The present kiln production rate is 15 TPH per kiln. The proposed rate is 18 TPH per kiln.

Calculated additional tonnage added to the kilns because of chains, attachments, wear bars and additional material will be approximately 12 tons per kiln.

Inspection of the kilns, piers and drives revealed that prior to the installation of spiral chain system the following should be completed on each kiln:

- A. Complete structural analysis of all kiln piers.
- B. Kiln shell survey at least up to and including No. 3 pier.
- C. Phillips Kiln Service should inspect and offer recommendations for all tires and rolls, with special emphasis placed on No. 4 pier.
- D. Kilns should be inspected by kiln manufacturer to evaluate condition of kilns for spiral chain installation and offer recommendations should rehabilitation work be required.
- E. Check existing load on each kiln drive motor and compare to rated capacity.
- F. Establish whether 45-48 RPH is the maximum operating kiln speed with the existing drives.

The existing kiln and cooler seals are totally inadequate for improved kiln efficiency. These seals will have to be upgraded at the time of the spiral chain installation.

Coolers:

At present, both coolers for all practical purposes are void of lifters. Clinker discharge temperature is 400° F+ which should be lowered to a maximum of 200° F.

While Phillips Kiln Service is checking the kiln tires and rolls, it would be advantageous to have them perform the same service on the coolers.

The cooler drive should be checked for its operating load as compared to the rated capacity.

A capital budget request for 42' of a new cooler shell for each cooler is being reviewed. If the request is approved, the lifters should be installed at the time of the shell installation. It would also be advantageous to install cast iron liners with lifters in the area between the brick lining and proposed lifters in the new shell sections.

I.D. Fans and Precipitator:

The I.D. fan is a direct drive, 720 RPM, 90,000 CFM and is presently operating at maximum horsepower. An investigation should be made to determine whether or not the fan capacity could be increased. A heat balance should be checked to determine the present kiln exit gas volume prior to increasing production. The present work being done on the precipitator and ducts should reduce the volume previously handled by the fans.

In order to establish the full capacity of the precipitator, the current density should be calculated.

Coal Mills:

The coal mills are operating at 50% capacity and no problem is foreseen in this area.

Finish Mills:

Grinding capabilities present no problems with increased kiln production.

Summary - Recommendations and Conclusions:

The Seattle plant presently produces approximately 175,000 tons of clinker per year at an average BTU rate of 7.6 MM BTU/Ton. It is estimated that the installation of the spiral chain system will increase clinker production to 280,000 tons per year and reduce fuel consumption to between 6.3 and 6.8 MM BTU/TON.

In order to implement the above savings, several changes in operating procedures and personnel are imperative. Firstly, at least one additional person should be added to the plant staff in the position of Energy Administrator. Present plant personnel can not devote the time necessary to fully implement this program and continue to operate the plant and perform the routine functions necessary for orderly plant operations. The most apparent method of insuring complete attainment of these goals would be to utilize a chemical engineer (either transfer or new hire) and have the part time services of Mr. Satish Sheth of the Santa Cruz plant to brief and instruct him in the basics necessary for initiating the program. Mr. Sheth could possibly commute to the Seattle plant occasionally to confer and direct in the basics of the program.

Additional duties would consist of overseeing certain aspects of equipment capabilities, collecting of data and establishing programs to better improve the overall efficiency and water reduction programs.

This was just a preliminary investigation and complete cost estimate will be made when all data sheets are received from the plant. However, at this time it would be advantageous to have the plant work up a cost estimate on the spiral chain installation.

Complete program was discussed with plant personnel and we would like to thank them for their fine cooperation during our visit.

Rm / Low